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ENVIRODYNE
ENGINEERS

RECOMMENDATIONS FOR FURTHER INVESTIGATION
VAN TRAN ELECTRIC COMPANY

Illinois Environmental Protection Agency
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I. PURPOSE AND OBJECTIVES

The purpose of the Van Tran Electric contamination assessment is to establish to what extent the property in question is a source of contamination with potential for release to the surrounding environment. The objectives are to characterize potential contaminant sources and to delineate any pathways of migration to off-site media or receptors.

The assessment activities proposed in this plan are necessary to perform a preliminary contamination assessment on-site. The program may have to be extended into further assessment activities, depending on the results obtained from this proposed investigation.

II. OVERVIEW OF INFORMATION AVAILABLE TO DATE

A. IEPA Files

The IEPA files contained sufficient information to establish the existence of environmental contamination, but not enough to define its extent.

B. Site Visit

With the permission of Van Tran, representatives of IEPA and EEI performed a brief site reconnaissance on May 15, 1986. The reconnaissance consisted solely of a walk-through. No sampling or interviewing of personnel was performed. Noted on the walk-through were general site layout, areas of obvious staining, unvegetated areas, placement of existing wells, and surficial drainage patterns.

C. Request for Additional Information

On May 28, 1986, a meeting was held at the Illinois Attorney General's office in Springfield, IL. In attendance were representatives of: the Attorney General, Van Tran, IEPA and EEI. Matters discussed and agreed upon are summarized in a letter dated May 30, 1986 from Mark La Rose of the Attorney General's office to Greg Wolk of Tockman and Wolk (Van Tran's attorneys), and Steve Parke, Vice President of Van Tran.

Of particular interest to EEI was information concerning the preliminary assessment Baker/TSA performed at the site as well as information from Van Tran on the sources of fill material used at their pit, an inventory of chemicals used, and a history of site operations.

D. Assessment of Baker/TSA's Information

The scope of Baker's services at the site were expressly limited to an initial preliminary assessment. The results of this assessment are illustrated on Sketches 1 through 3 in Appendix A of this report.

III. RECOMMENDATIONS FOR OBTAINING ADDITIONAL INFORMATION

Based on Baker's preliminary investigation, data in the IEPA files, observations from the May on-site walk-through, and the absence of complete data on past operations, we recommend the following site investigation program. (Although this report outlines techniques to be used in this program, all site work will be governed by IEPA-approved work plans, quality assurance plans, and health and safety plans.)

A. Mapping

Produce a topographic survey of the site, using aerial photography, mapping horizontal distances of the physical features and facilities to a horizontal datum based on the Illinois State Plane Coordinate System and vertical distances to the National Geodetic Vertical Datum (mean sea level). The survey crew will establish, in the field, the vertical and horizontal controls. This control will be used to accurately locate appurtenances, roads, drainage ditches, culverts, pipes, fences, buildings, etc. The accuracy of the measurements will be within 0.5 feet horizontal and 0.1 feet vertical. The site map will be prepared on a format of 24 by 36 inches for the entire property showing 1-foot contours, with a scale of 1 inch = 100 feet.

The four existing wells will be shown on the site map. Additionally, a tabulated list will be prepared showing the coordinates to the closest foot, natural ground elevation to the neartest one-tenth foot, and the top elevation of the monitoring well riser pipes to the closest one-hundredth foot. All final drawings will be sealed by an Illinois Registered Land Surveyor.

Any other wells installed as a part of this assessment will be surveyed in a similar manner and included on a finalized site map.

B. Groundwater Monitoring Wells

1. Existing Wells

The existing set of wells was not designed for the purposes of groundwater monitoring and is not adequate for that purpose. Once these wells have been surveyed, however, they will prove valuable in obtaining initial water level and flow direction information needed to provide guidance for the placement and installation of an adequate monitoring system.

2. Recommended Well Program

We recommend the following program to assess groundwater contamination at the site:

- Coordinate with the Illinois State Geological Survey and local well drillers to obtain all available information on local stratigraphy and aquifer characteristics.

- Survey the existing wells as described

- Determine water levels in these wells to the nearest 0.05 foot from the top of the surveyed casing.

- Prepare a preliminary water-level contour map based on the measurements.

- Based on these water-level contours, the information above, and surficial drainage patterns (the most likely contaminant transport corridors), install a groundwater monitoring system consisting of a series of stainless steel wells.

To serve as a monitoring system, a minimum of four wells will be required; one upgradient from the contaminant sources and three downgradient from them. Due to the site's small size, relatively flat topography, and the probability of groundwater "mounding" at the site, the upgradient well will probably have to be placed off-site to serve as a background well in terms of contamination.

A preliminary idea of placement of these wells is shown in Sketch A.

a. Well Placement - **Placement of these wells is contingent upon the groundwater flow direction as determined from the existing wells.**

b. Well Installation - Prior to installation of monitoring wells, a single boring will be made to bedrock upgradient of the site (in terms of groundwater flow). During the boring, samples for physical inspection will be taken at each stratum change or at a minimum of every 5 feet. The samples will be described and the borehole logged in the field. Information from this boring will be used as a partial basis for well and screen design and placement. Subsequent to sampling and logging, the borehole will be backfilled and sealed with a bentonite/cement grout to approximately the depth of the setting of downgradient wells. A well will then be placed in this borehole to serve as an upgradient background well (Well "E").

Once the placement and design of the wells has been decided, wells will be drilled using 3-3/4 inch ID hollow stem augers. Soil samples will be collected continuously. Continuous samplers will be opened immediately for the geologist's inspection and sample collection. Samples for physical analyses will be taken at each stratum change or at a minimum of every 5 feet in the upgradient boring and from the water-bearing stratum for the other 4 wells. Physical analyses will include horizontal permeability and grain-size analysis. Samples for chemical analyses will be obtained each 5-foot interval or stratum change at wells A, B and the background well. Samples at wells C and D will be obtained at 1-foot intervals to groundwater. Analytes are listed in Section F.

All casing, couplings and screens will be of 316 stainless steel, with a 2-inch inside diameter. Screens will be in 5 foot lengths and shall be slotted, wire-wound with a slot size of 0.01 inch.

Development of the wells shall be performed after the final finishing details are completed on the wells. These details include the final grouting to the surface and installation of lockable protective casing and cap. Development shall be performed by the drill crew, utilizing the rig to evacuate the appropriate amount of water from each well using air-lift techniques.

Once the borehole has been drilled to the desired depth and diameter, the installation of the monitor well will begin within 12 consecutive hours of boring completion. Once begun, monitor well installaion will not be interrupted unless an unscheduled delay occurs, e.g., personal injury.

The monitor well string will be emplaced within the auger or open, mudded hole and an approved sand pack backfill will be added. Synchronized addition of the sand pack and removal of the auger string will take place in small increments (approximately 1-foot units). The sand pack will be terminated 1-foot above the top of the monitor well screen. Once the sand pack is in place, a bentonite pellet seal will be added to a minimum thickness of 2 feet. The thicknesses of the sand pack and bentonite seal will be determined through use of a weighted, steel measuring tape. The bentonite pellets will be forced out of the auger into the borehole annulus during emplacement by the use of a 3/4-inch diameter PVC "tamping tool."

After emplacement of the bentonite pellet seal, the borehole annulus will be grouted with an expanding cement mixture with 5 percent bentonite. The grout mixture will be incrementally added through a tremie line as the augers are removed. The borehole annulus will be grouted to a point above the ground surface and then mounded to shed surface water. A steel protector pipe shall be emplanted in this grout cap and fitted with a hinged lid and secured with hasp and keyed lock. The grout will be checked in 24 hours for settling, and the boring will be recapped in the same manner.

In the event that drilling fluids are needed, bentonite will be the only drilling fluid additive accepted for these types of borings. No organic additives shall be used.

The source(s) of water to be used in any phase of the well construction, including drilling, grouting, sealing, purging, well installation, well development or equipment washing, will be approved prior to its use by the IEPA Project Manager. The water source(s) should be ideally free of survey-related contaminants, verified by pre-testing. It should also come from a deep, upgradient ground water source with convenient access and good pumping capacity.

If it is ever necessary to utilize water during drilling, accurate records and measurements of used and lost fluids will be maintained. A minimum of five times the lost fluid will be purged from the well during development.

c. Well Screening - Screening depths, intervals and lengths will be determined based on information obtained from the Illinois State Geological Survey and local well drillers, flow direction determinations obtained from groundwater level measurements, and logging information obtained during the boring to bedrock described above.

d. Well Development - The development of monitor wells will be performed as soon as possible after completion of the well construction. Adequate time must be allowed for mortar to set and paint (if appropriate) on the protective casing to completely dry. Generaly, 48 hours after final finishing details are completed, the wells are ready to be developed.

Wherever possible, the preferred method for development consists of pumping a minimum of five time the volume of standing water in the borehole, aided by a surge block to remove caked-on sediments from the boring walls and screen openings. A bottom-filling/discharging bailer is also used to help remove sediments from the well after surging. Normally, a stainless-steel submersible pump capable of pumping to 30 gpm is used to purge the wells.

In the case of 2-inch wells, most pumps available do not pump at high enough rates to facilitate development. In these cases, development will be carried out with a bailer and surge block only. The development shall continue in this manner until the following conditions are met:

1) The well water is clear to the unaided eye.

2) Sediment thickness at the bottom of the well is less than 5 percent of screen length.

3) Five times the standing water volume in the well and the saturated borehole annulus is removed.

4) Five times the amount of added fluid/water used during drilling is removed.

The development of each well should be completed at least 14 days prior to the first sample collection to allow all aquifer conditions to return to a pre-drilling/development state. A log will be kept on each well detailing the development procedures and will include the following:

1) Well designation

2) Date(s) of well installation

3) Date(s) and time of well development

4) Static water level from top of well casing before and 24 consecutive hours after development

5) Quantity of mud/water lost during drilling and/or fluid purging

6) Quantity of fluid in well prior to development; either standing in well and/or contained in saturated annulus (assume 30 percent porosity)

7) Any field water quality measurements made during purging (i.e., pH, conductivity, temperature, etc.)

8) Depth from top of well casing to bottom of well (from diagram)

9) Screen length (from diagram)

10) Depth from top of well casing to top of sediment inside well, before and after development

11) Physical character of removed water, to include changes during development in clarity, color, particulates and odor

12) Type and size/capacity of pump and/or bailer used

13) Description of surge technique, if used

14) Height of well casing above ground surface

15) Quantity of fluid/water removed and time for removal (present both incremental and total values)

e. Equipment Decontamination - All equipment (augers, split spoons, samplers, drill rods, etc.) which comes in contact with the borehole will be thoroughly stream cleaned and solvent rinsed between borings. Water used during the installation and decontamination phases of this task will be from a state-approved source and free from residual chlorine.

The rinsing sequence will be as follows: gross removal of cuttings from tools into drums, steam cleaning of tools over a portable steel pond, rinsing with methanol, and a final steam cleaning with the approved water. All water used in the rinsing and steam cleaning will be contained and stored on-site in a designated area in sealed DOT 17H/55-gallon drums.

All cuttings will be contained in the drums and stored on-site in the designated area.

A site for temporary storage of cuttings and liquids will be constructed in a designated area approved by the IEPA Project Manager.

f. Aquifer Testing - Aquifer testing will be performed as part of the groundwater sampling phase of the investigation. The testing program will consist of single well slug/baildown tests. Test data will be interpreted with the method described by Cooper et al. (Water Resources Research, Vol. 3, No. 1, 263-269, 1967) to determine transmissivity, hydraulic conductivity/permeability, and if the aquifer is confined or semi-confined, the storage coefficient.

To supplement this data, water level measurements will be taken bimonthly, for the duration of the project, on all monitoring wells to detect seasonal fluctuation.

g. Purging - Prior to sampling each well, five times its standing volume of water should be removed by pumping or bailing. This is done in addition to well development and is necessary prior to each sampling episode.

h. Groundwater Sample Collection - Samples from the monitoring wells will be collected one time during the site investigation. Sampling procedures will commence no sooner than two weeks after wells have been developed. This will allow for the aquifer characteristics to return to pre-drilling conditions. Sample collection will begin, however, as soon as possible following this two-week waiting period.

The wells will be measured to determine water level prior to sampling. Bailers will be used to purge and sample the wells.

All bailers will be thoroughly rinsed in deionized water between sampling of each well. A separate dedicated polypropylene line will be used as a retrieving line for each well to be sampled. This will reduce chances for cross contamination. The groundwater samples will be analyzed for volatile organics, base/neutral/acids, metals and PCBs as presented in Section F. The need for additional groundwater sampling events will be determined based on the results of this initial sampling.

C. Core Samples

While the drill rig is on-site for well installation, two cores extending to the groundwater level will be obtained from the pit.

We propose that the following logic dictate sampling intervals in the pit borings:

1) Sample at discrete 1-foot intervals for each of the top 1 feet and for the section of the boring from 8 feet to groundwater.

2) Sample the sections from 2 to 8 feet in 3-foot composites. Analyze the top 1-foot interval for PCBs and metals as described in Section F. Analyze all other samples for these parameters plus volatile organics.

3) During the borings, obtain field readings of volatile organics from each 1-foot interval with a portable HNU. In the event that any discrete 1-foot interval in the boring section from 2 to 8 feet indicates an HNU reading of greater than 25 ppm and the adjacent intervals do not, this interval should be analyzed for volatile organics and not be composited into the 3-foot sample composite proposed for this section of the boring.

It is anticipated that surface and subsurface samples from the areas of Sites 11 and 12 (from the Baker/TSA study) will be obtained during installation of Wells C and D. If these wells are not sited in these areas, additional corings as specified for the pit area will be required at these sites.

D. Wipe Samples

The widespread surficial PCB contamination on-site indicates multiple sources and recent or current contaminant transport. Among the potential sources are several locations on the concrete pad. EEI recommends sampling these areas for PCBs by taking composite wipe samples (2 to 3 100 cm2 areas sampled and composited per site). Five sites (shown in Sketch B of Appendix B) are recommended for sampling:

1) Heavily stained concrete pad adjacent to pit

2) Stained metal in staging area on concrete pad

3) Concrete north of staging area (direction of drainage)

4) Concrete east of staging area (heavily stained)

5) Stained concrete around tanks staged on pad

E. Soil Samples

The soil sampling and analysis performed in the Baker study establishes the presence of contaminants in site drainageways. Several additional areas are, however, potential contaminant sources and are recommended for sampling and analysis for the parameters listed in Section F.

1) A composite of no more than four discrete surface samples from the graveled parking area to the east of Well 4. (This area receives sheet flow from site surface drainage.)

2) A similar composite from the northeast section of the site (surface drainage from around the "side building").

3) A similar composite from the low-lying, largely unvegetated area to the far west of the concrete pad.

The top 1-foot interval should be sampled at the areas specified. Soil probe, bucket auger, or Shelby tube methodology for sampling are all adequate. Deontamination procedures specified for wells should be followed.

As stated in previous sections, soil samples in the two southern site drainageways at their exits from the site (Baker/TSA study Sites 11 and 12) will be obtained during either well installation or core sampling.

F. Chemical Analytes

IEPA files on the site indicate the use of a wide variety of materials. Based on this information, the following chemical analytes are recommended for groundwater samples, core samples and soil samples:

1) Volatile Organic Compounds by EPA Method 624 with library search

2) Base/Neutral/Acids by EPA Method 625 with library search

3) Metals as specified in IEPA Contract Laboratory Program

4) PCBs

Detection levels and QA/QC procedures for all analytes will be those specified under the IEPA Contract Laboratory Program. Wipe samples need only be analyzed for PCBs.

IV. SUMMARY OF PROPOSED ACTIVITIES

1) Installation and sampling of four monitoring wells

2) Installation, samping, logging and closure of one boring to bedrock

3) Obtaining and physical analysis of subsurface soil samples

4) Obtaining and chemical analysis of composite samples of surface soils, composite wipe samples, and subsurface soil samples obtained from wells and borings

5) Data interpretation and reporting

Estimated numbers of samples and corresponding analytical parameters are:

Sample Type	Number of Samples by Parameter			
	Physical Analyses	VOAs	Metals	PCBs
Borings-Well A	1	5	5	5
Borings-Well B	1	5	5	5
Borings-Well C	1	13	13	13
Borings-Well D (Background Well)	5	5	5	5
Wipe Samples	0	0	0	5
Borings-Pit	0	8	8	8
Surface Soils	0	0	3	3

ATTACHMENT A

MONITOR WELL INSTALLATION

SPECIFICATIONS

1) Wells to be constructed using 3-3/4 inch IDHSA in unconsolidated materials to a maximum estimated depth of 30 feet

2) Continuous samplers will be utilized to obtain samples for the entire length of the wells; Total Continuous Core Sampling: 30 x 4 = 120 feet

3) Well construction materials and specs:

   a) Installation of casing through HSA, if necessary
   b) 2 inch ID stainless steel threaded casing
   c) 5 foot stainless steel screens, 0.01 inch slot - precut
   d) Install protective steel risers with hinged, lockable lids
   e) Washed silica sand as granular filter
   f) Bentonite seal above filter
   g) Portland/grout mix to surface

4) Wells will be developed by surge-block techniques

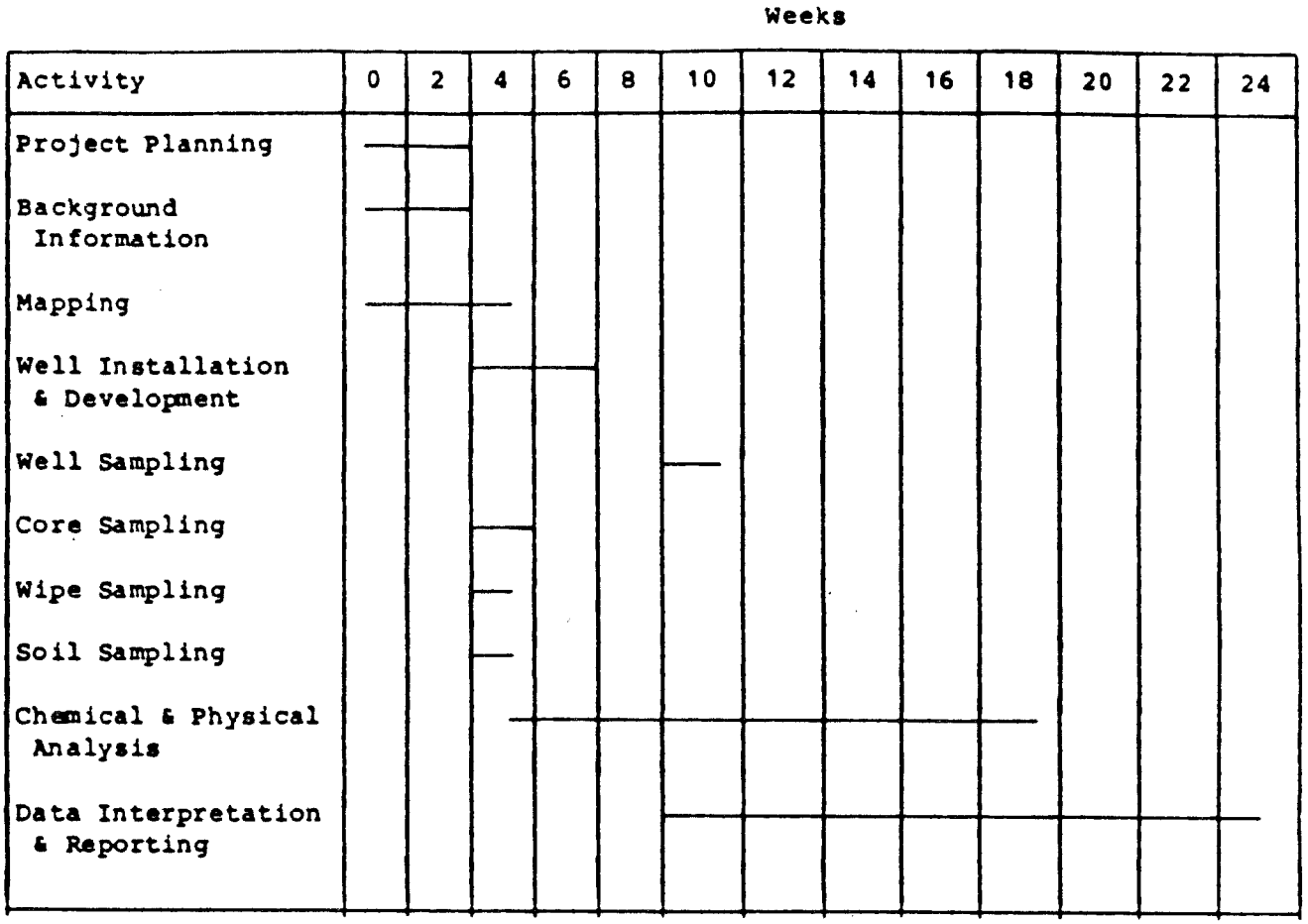
5) An HNU Model PI 101 photoionization detector instrument or an acceptable substitute will be utilized during these tasks to establish levels of personal protection required. If volatile emissions are detected, Level C will be specified. At a minimum, work will be done under Level D protection. Level D protection will consist of:

   a) Rubberized gloves
   b) Safety glasses/goggles
   c) Hard hat
   d) Steel toed boots

6) Cuttings and well development fluids to be contained in DOT 17H/ 55-gallon drums

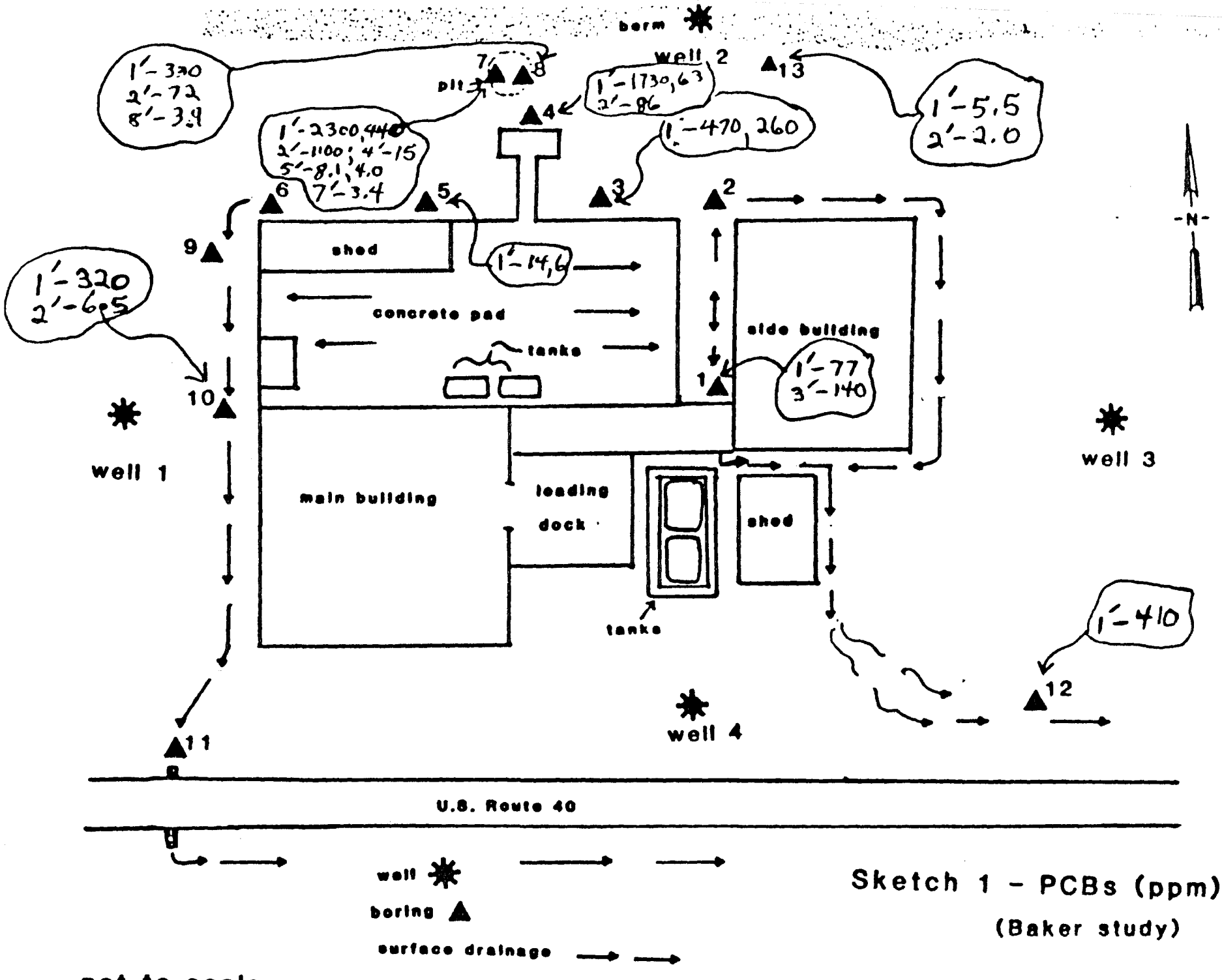
7) Decon of all tools and equipment between borings by high pressure steam, clean water rinse, methanol rinse, clean water rinse

VAN TRAN ELECTRIC
PROPOSED PROJECT SCHEDULE



APPENDIX A

MAJOR CONTAMINATION - BAKER STUDY



Sketch 1 - PCBs (ppm)

(Baker study)

not to scale

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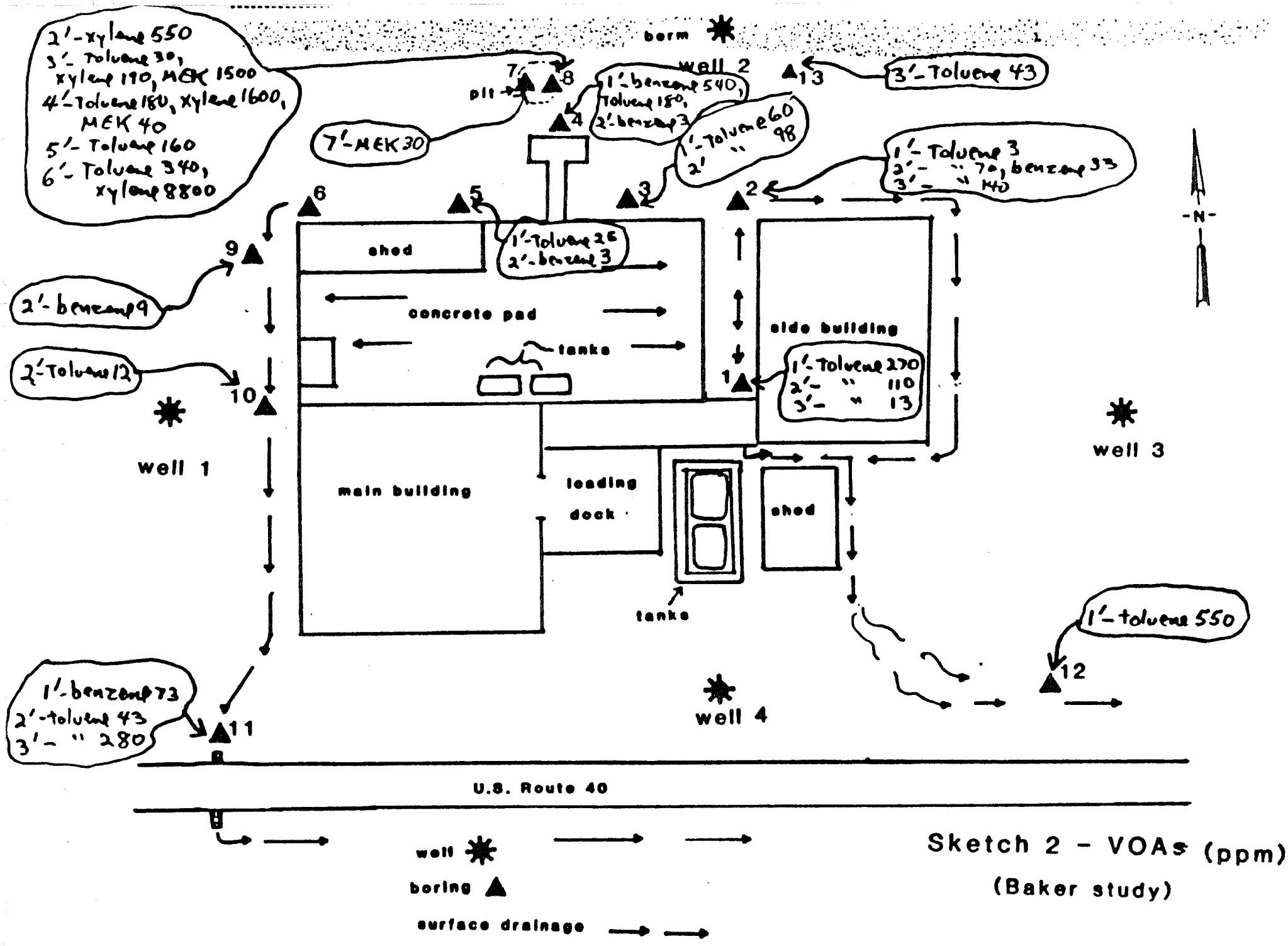
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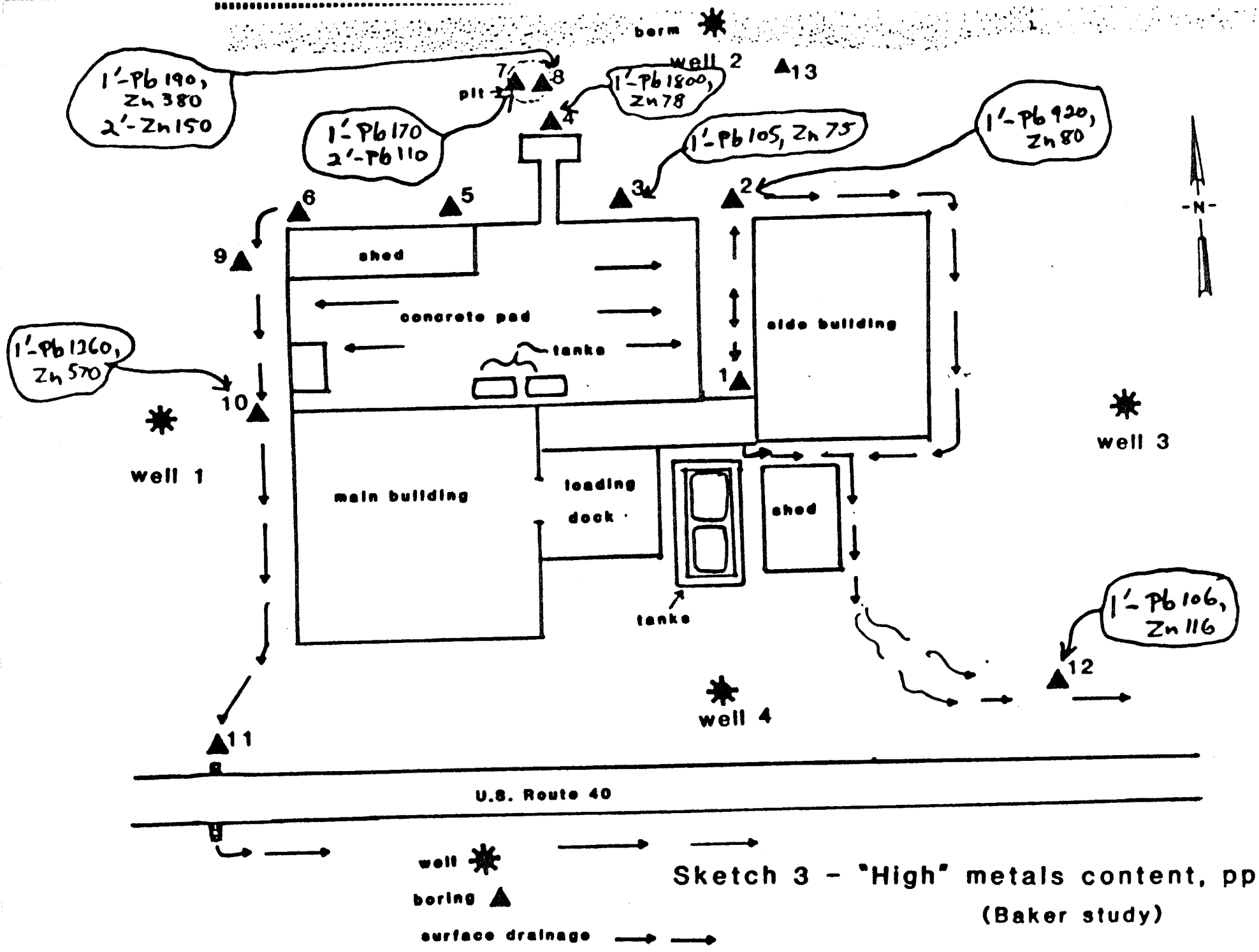
5'- Toluene 160
6'- Toluene 340, xylene 8800
berm
well 2
pit
7'-MEK 30
1'-benzene 540, Toluene 180, 2'-benzene 3
1'-Toluene 60 " 98 2' "
3'-Toluene 43
1'-Toluene 3 2'- " 70, benzene 33 3'- " 140
N
shed
1'-Toluene 26 2'-benzene 3
concrete pad
tanks
2'-benzene 9
2'-Toluene 12
side building
1'-Toluene 270 2'- " 110 3'- " 13
well 1
well 3
main building
loading dock
shed
tanks
1'-toluene 550
1'-benzene 73 2'-toluene 43 3'- " 280
well 4
U.S. Route 40
well
boring
surface drainage
Sketch 2 - VOAs (ppm)
(Baker study)
not to scale
Van Tran Electric



Sketch 3 - "High" metals content, ppm
(Baker study)

not to scale

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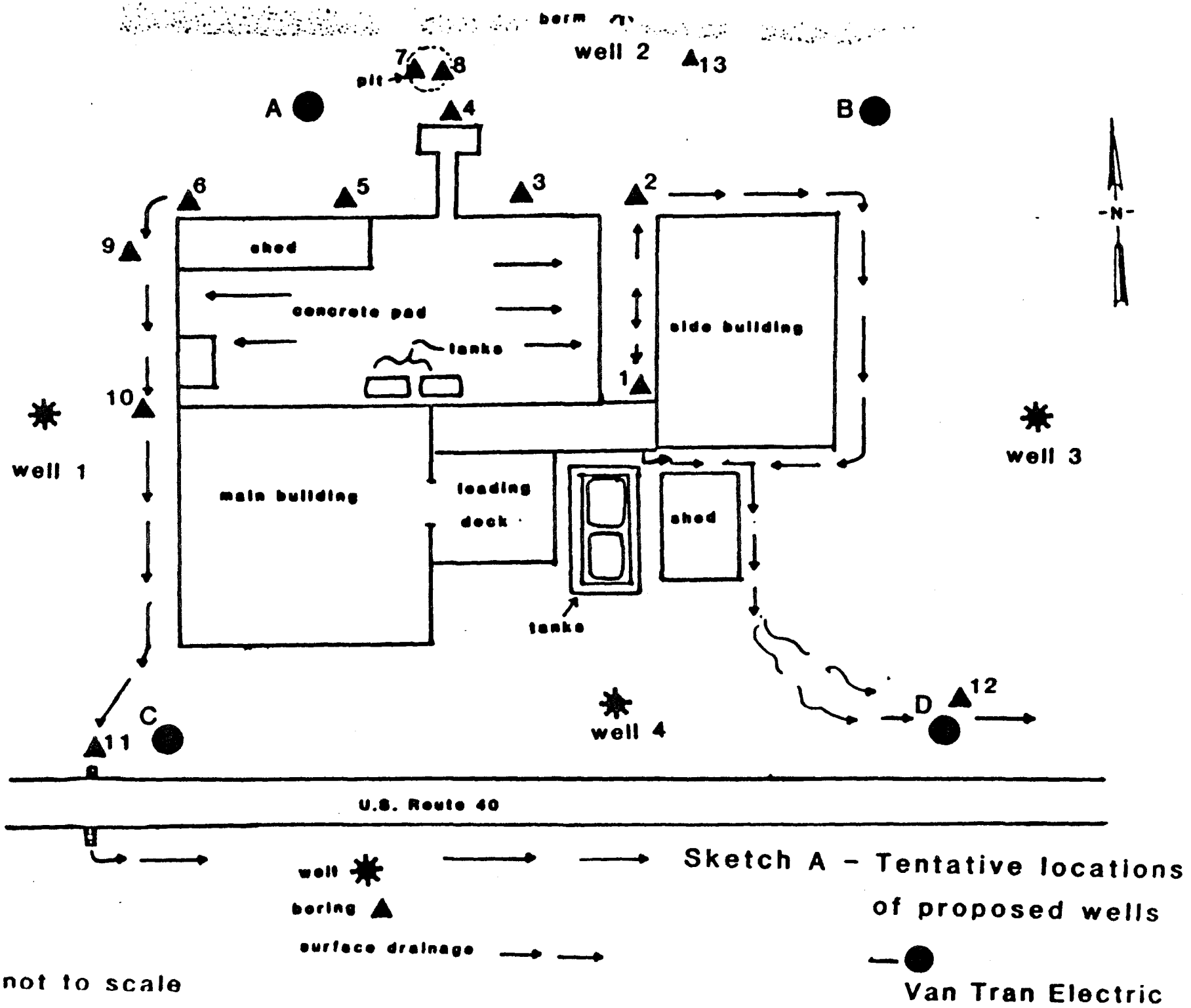
APPENDIX B

TENTATIVE WELL PLACEMENT*
SOIL AND WIPE SAMPLE SITES

(*Subject to determination of groundwater flow.)



Sketch A – Tentative locations of proposed wells

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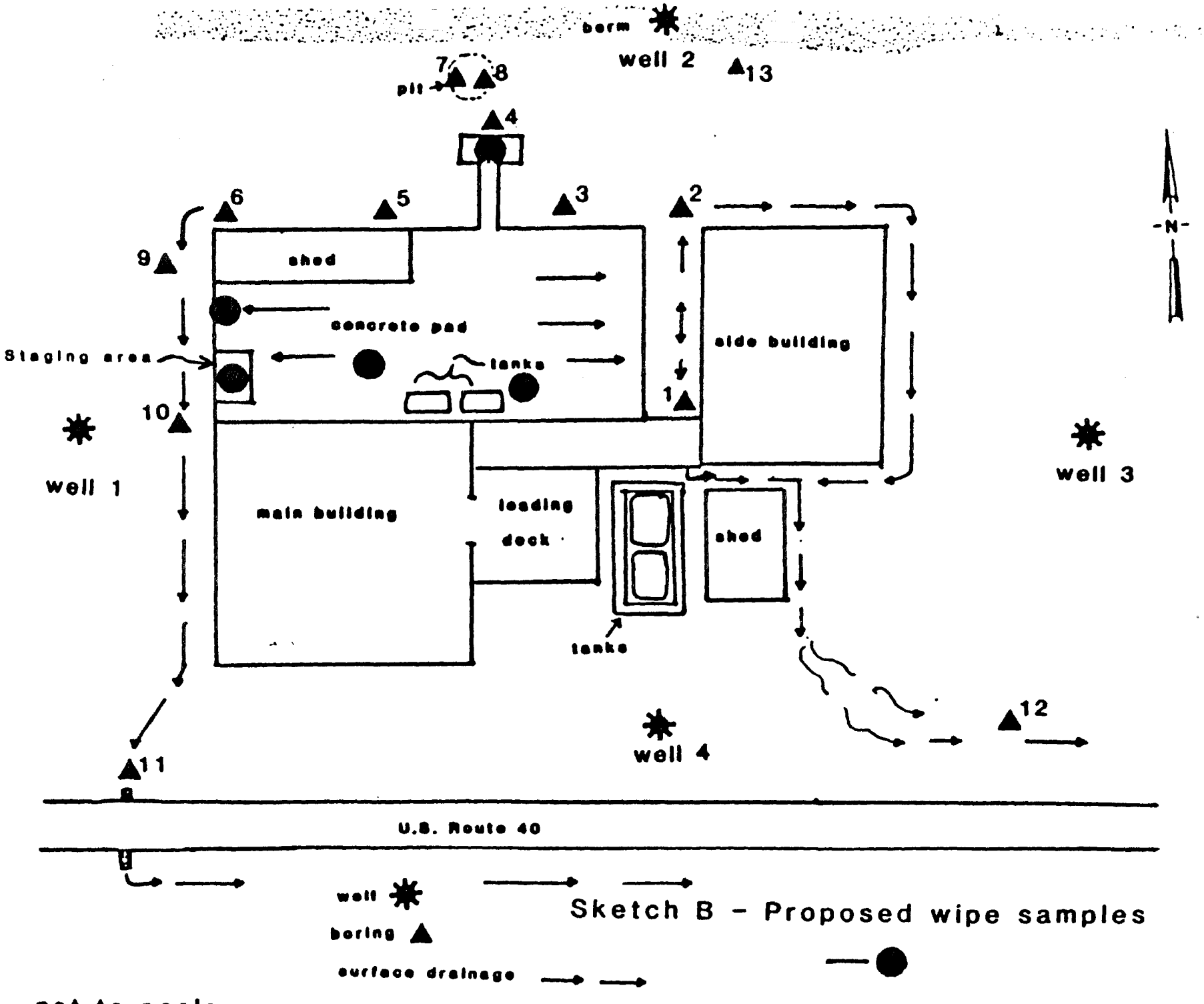

Sketch B - Proposed wipe samples

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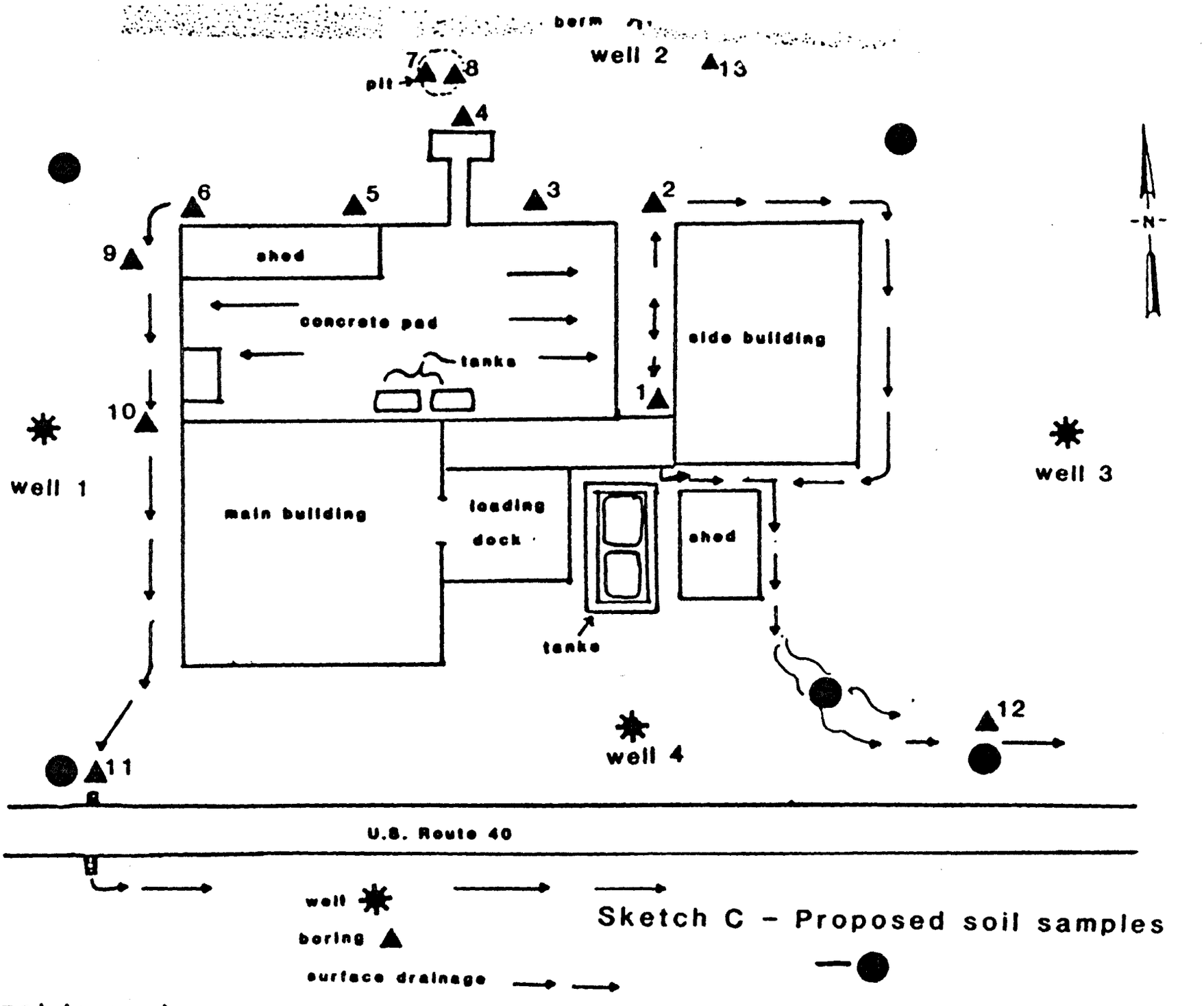

Sketch C – Proposed soil samples

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